NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date:

Region: Raleigh Regional Office
County: Durham
NC Facility ID: 3200144
Inspector's Name: Stanley Williams
Date of Last Inspection: 08/17/2018
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): Duke University

Facility Address:
Duke University
501 Douglas Street
Durham, NC 27705

SIC: 8221 / Colleges and Universities, Nec
NAICS: 61131 / Colleges, Universities, and Professional Schools

Facility Classification: Before: Title V **After:** Title V
Fee Classification: Before: Title V **After:** Title V

Permit Applicability (this application only)

SIP: 02D .0503, .0516, .0521, 0530(u), .1100, .1806
NSPS: Dc, IIII
NESHAP: ZZZZ, JJJJJJ
PSD: NA
PSD Avoidance: 02Q .0317
NC Toxics: 02D .1100
112(r): NA
Other:

Contact Data

Facility Contact	Authorized Contact	Technical Contact
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Application Data

Application Number: 3200144.19A
Date Received: 06/21/2019
Application Type: Renewal
Application Schedule: TV-Renewal

Existing Permit Data
Existing Permit Number: 03254/T42
Existing Permit Issue Date: 01/10/2019
Existing Permit Expiration Date: 12/31/2019

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2017	0.4700	75.82	5.41	72.24	1.62	1.44	1.37 [Hexane, n-]
2016	0.4500	66.27	5.03	69.15	1.29	1.41	1.34 [Hexane, n-]
2015	0.4500	71.60	5.37	70.96	6.90	1.43	1.36 [Hexane, n-]
2014	0.4900	76.80	5.29	71.57	7.35	1.46	1.34 [Hexane, n-]
2013	0.4900	73.56	5.43	74.18	7.02	1.56	1.46 [Hexane, n-]

Review Engineer: Eric Crump

Review Engineer's Signature: **Date:**

Comments / Recommendations:
Issue 03254/T43
Permit Issue Date:
Permit Expiration Date:

1. Purpose of Application

Duke University is a university and medical center located in Durham, Durham County, North Carolina. The facility operates under Title V Permit No. 0325T42 with an expiration date of December 31, 2019. Duke has applied for renewal of their facility's air quality permit. The renewal application was received on June 21, 2019, or at least six months prior to the expiration date. Therefore, the existing permit shall not expire until the renewal permit has been issued or denied. All terms and conditions of the existing permit shall remain in effect until the renewal permit has been issued or denied.

Through permit application No. 3200144.19A, Duke included the following changes to the existing permit:

- Administrative changes to various emergency generators, correcting listed horsepower
- Removal of permit condition 2.2.B.1 from the permit (annual reporting requirement related to the 2011 Coal Boilers Removal Project)

2. Facility Description

The Duke University facility includes the Duke University Medical Center (DUMC) physical plant, the East Campus, and the West Campus Steam Plant. The East Campus has a dedicated steam plant consisting of 15 Miura natural gas-fired boilers, each with a capacity of 12.25 million British thermal units per hour (mmBTU/hr), which were started up on December 4, 2009. The West Campus Steam Plant, consisting of six boilers ranging from 69 to 99 mmBTU/hr in size, supplies steam for the DUMC in addition to the University. For all practical purposes, the West Campus Steam Plant uses natural gas as their primary fuel with No. 2 fuel oil as the backup fuel. The permit also covers ethylene oxide sterilizers and numerous emergency generators.

3. Application Chronology

January 13, 2015	Permit No. 0325T39 issued to Duke as a Title V renewal.
September 18, 2015	Compliance inspection conducted by Stanley Williams, Raleigh Regional Office (RRO). Facility appeared to be operating in compliance with all permit requirements.
October 23, 2015	DAQ received minor permit modification application No. 3200144.15A to add a 3,250 kW diesel-fired emergency generator near the West Campus Chilled Water Plant No. 1.
November 2, 2015	DAQ sent letter to Duke acknowledging receipt of application No. 3200144.15A.
January 21, 2016	Permit No. 0325T40 issued to Duke.
March 9, 2016	Notice of Violation issued to Duke for failure to submit a 2015 annual compliance certification by its due date.
August 5, 2016	Compliance inspection conducted by Stanley Williams, RRO. Facility appeared to be operating in compliance with all permit requirements.
July 25, 2017	Compliance inspection conducted by Stanley Williams, RRO. Facility appeared to be operating in compliance with all permit requirements.
November 9, 2017	DAQ received minor permit modification application No. 3200144.17A to add

	two diesel fuel-fired emergency generators: one (1,474 horsepower (HP)) at Duke Hospital North No. 2, and one (2,206 HP) at MSRB No. 3.
December 12, 2017	Permit No. 0325T41 issued to Duke.
August 17, 2018	Compliance inspection conducted by Stanley Williams, RRO. Facility appeared to be operating in compliance with all permit requirements.
September 20, 2018	DAQ received minor permit modification application No. 3200144.18A to replace a 1,115 HP emergency generator (ID No. ES-7547-04) with a 1,474 HP (1,000 killowatt (KW)) emergency generator at Duke North (ID No. ES-7547-04b).
January 10, 2019	Permit No. 0325T42 issued to Duke.
June 21, 2019	DAQ received permit renewal application No. 3200144.19A from Duke.
July 1, 2019	DAQ sent letter to Duke acknowledging receipt of application No. 3200144.19A.
September 13, 2019	Compliance inspection conducted by Stanley Williams, RRO. Facility appeared to be operating in compliance with all permit requirements.
October 3, 2019	Notice of Deficiency (NOD) issued to Duke for failure to report Coal Boiler Removal Project data as required by the permit.
October 21, 2019	Duke responds to NOD, submitting Coal Boiler Removal Project data as required by the permit.

4. Permit Modifications and Title V Equipment Editor (TVEE) Discussion

The following table summarizes changes to the Duke permit resulting from the permit renewal:

Page No.	Section	Description of Changes
Cover and throughout	---	Updated all dates and permit revision numbers
Insignificant Activities List	Attachment	• Corrected horsepower ratings for Source ID Nos. I-7776-01, I-7583-01, I-7686-01, I-7552-01, I-7589-01, I-7739-01, I-7198-01, I-7733-01, and I-7760-02 • Changed location name of Source ID No. I-7739-01 to "Rubenstein Hall" • Changed location name of Source ID No. I-7760-02 to "Fuqua School of Business 2"
Signature Page	---	Updated Facility Site Location
4	1	• Changed Source ID No. for ES-7547-03, Diesel fuel-fired emergency generator (1,115 hp), Duke Hospital North No. 4 to ES-7547-04 • Changed Source ID No. for ES-7547-03, Diesel fuel-fired emergency generator (2,937 hp), Duke Hospital North No. 4 to ES-7547-03A
5	1	Corrected horsepower rating for Source ID No. ES-7764-01
6	1	Corrected horsepower ratings for Source ID Nos. ES-7735-01 and ES-7559-01

Page No.	Section	Description of Changes
8	1	Removed asterisks and footnotes for Source ID Nos. ES-7796-01, ES-7547-02B, ES-7524-02, and ES-7547-04B
9-10	2.1 A.1, 2	Added source ID numbers for generators
10	2.1 A.3	Updated to current version of stipulation for 40 CFR 63 Subpart ZZZZ
10-12	2.1 A.4	Updated to current version of stipulation for 40 CFR 60 Subpart IIII for diesel fuel-fired emergency engines
13	2.1 B.1	Added source ID numbers for boilers
13-16	2.1 B.2	Updated to current version of stipulation for 40 CFR 60 Subpart Dc for boilers firing No. 2 fuel oil
16	2.1 B.3.c	Added source ID numbers for boilers
16-17	2.1 B.5	Updated to current version of avoidance conditions for 40 CFR 63 Subpart JJJJJ for area source boilers
18	2.1 C.1	Added source ID number for boiler
18-21	2.1 C.2	Updated to current version of stipulation for 40 CFR 60 Subpart Dc
21	2.1 C.3.c, 4.c	Added source ID number for boiler
22	2.1 C.5	Updated to current version of avoidance conditions for 40 CFR 63 Subpart JJJJJ for area source boilers
23-24	2.1 D.1, 2, 3	Added source ID numbers for boilers
24-25	2.1 E.1	Added source ID number for boiler
25-27	2.1 E.2	Updated to current version of stipulation for 40 CFR 60 Subpart Dc
27	2.1 E.3.c	Added source ID number for boiler
27-28	2.1 E.4.c	Added source ID number for boiler
28	2.1 F	Changed “Initial Reporting/Fuel Recordkeeping” in table to “Fuel Recordkeeping”
28-29	2.1 F.1, 2, 3	Added source ID numbers for boilers
29	2.1 F.4.c	Deleted initial reporting requirement already satisfied by Permittee
30	2.1 G	Changed source ID No. ES-7547-03 to ES-7547-03A in list of Diesel fuel-fired emergency generators Added source ID No. ES-7547-04 (1,115 hp, Duke Hospital North No. 4) to list of Diesel fuel-fired emergency generators Corrected horsepower ratings for Source ID Nos. ES-7764-01, ES-7735-01, and ES-7559-01
32	2.1 G	• Added source Nos. ES-7547-02, ES-7547-04 to list of sources regulated for sulfur dioxide and visible emissions • Changed source ID No. ES-7547-03 to ES-7547-03A in list of sources regulated for sulfur dioxide and visible emissions
33	2.1 G.1.a, 2.a	• Added source Nos. ES-7547-02, ES-7547-04 to list of sources • Changed No. ES-7547-03 to ES-7547-03A in list of sources
33	2.1 G.1.c, 2.c	• Added source ID numbers for generators • Added source Nos. ES-7547-02, ES-7547-04 to list of sources • Changed No. ES-7547-03 to ES-7547-03A in list of sources

Page No.	Section	Description of Changes
34	2.1 G.3.b	Added source ID numbers for generators
36	2.1 G.6	Corrected HP rating for Source ID No. ES-7559-01 in list of sources
36-38	2.1 G.6	Updated to current version of stipulation for 40 CFR 60 Subpart IIII for emergency generators
38-40	2.1 G.7	Updated to current version of stipulation for 40 CFR 60 Subpart IIII for non-emergency generators
40	2.1 G.8	• Corrected horsepower rating for Source ID No. ES-7559-01 in list of sources • Updated to current version of stipulation for 40 CFR 63 Subpart ZZZZ for RICE located at an area source
41-44	2.1 G.9	Added stipulation for 40 CFR 63 Subpart ZZZZ for RICE located at an area source not subject to NSPS
47-48	2.2 B, D	Deleted stipulations related to • Boiler ID No. ES-7754-03b/Coal Boilers Removal Project • Facility-wide emission sources – MACT affected sources
47-52	2.2 C, E, F, and G	Re-lettered Sections 2.2 C, E, F, and G as Sections 2.2 B, C, D, and E
47	2.2 C	Added reference to permit application No. 3200144.05C to Footnote No. 1
48	2.2 D	Added Footnote No. 3
50	2.2 E.1.e	Noted that the Permittee submitted the required Notification of Compliance Status no later than July 19, 2014.
54-63	3	Updated General Conditions to Version 5.3 dated August 21, 2018

The following changes were made to the Title V Equipment Editor (TVEE):

Source ID No.	Former Description	New Description
I-7776-01	Diesel-fired emergency generator (300 hp), Duke Hospital LSRC II	Diesel-fired emergency generator (465 hp), Duke Hospital LSRC II
I-7552-01	Diesel-fired emergency generator (65 hp), DUMC, BMT Dialysis	Diesel-fired emergency generator (50 hp), DUMC, BMT Dialysis
I-7589-01	Diesel-fired emergency generator (32 hp), DUMC, CFL	Diesel-fired emergency generator (32 hp), DUMC, CFL - Fitness
I-7739-01	Diesel-fired emergency generator (90 hp), Sanford Addition	Diesel-fired emergency generator (122 hp), Rubenstein Hall
I-7198-01	Natural gas-fired emergency generator (155 hp), Nasher Art Museum	Natural gas-fired emergency generator (176 hp), Nasher Art Museum
I-7733-01	Diesel-fired emergency generator (67 hp), Center for Athletic Excellence [NSPS Subpart IIII]	Diesel-fired emergency generator (130 hp), Center for Athletic Excellence [NSPS Subpart IIII]
I-7760-02	Diesel-fired emergency generator (380 hp), Fuqua School	Diesel-fired emergency generator (779 hp), Fuqua School of Business 2
ES-7764-01	One diesel-fired emergency generator (764 hp), Primate Center	One diesel-fired emergency generator (772 hp), Primate Center
ES-7735-01	One diesel-fired emergency generator (1,200 hp), CIEMAS Building	One diesel-fired emergency generator (1,085 hp), CIEMAS Building
ES-7559-01	One diesel-fired emergency generator (2682 hp), Cancer Center [NSPS IIII, GACT ZZZZ]	One diesel-fired emergency generator (2937 hp), Cancer Center [NSPS IIII, GACT ZZZZ]
ES-7547-01	One diesel fuel-fired emergency generator (1115 hp), Duke Hospital North No. 1	One diesel fuel-fired emergency generator (1,115 hp), Duke Hospital North No. 1

Source ID No.	Former Description	New Description
ES-7547-02	One diesel fuel-fired emergency generator (1115 hp), Duke Hospital North No. 2	One diesel fuel-fired emergency generator (1,115 hp), Duke Hospital North No. 2

Two emergency generators located in Duke Hospital north had been mistakenly assigned the same source ID number in the permit– ES-7547-03. However only one of the two generators was listed in the TVEE. This was corrected in the TVEE as follows:

- The source number for ES-7547-03, One diesel fuel-fired emergency generator (2,937 hp), Duke Hospital North No. 3, was changed to ES-7547-03A.
- The following source was added to the TVEE: Source ID No. ES-7547-04, one diesel fuel-fired emergency generator (1,115 hp), Duke Hospital North No. 4.

5. Description of Changes and Estimated Emissions

A. Administrative changes to various emergency generators, correcting listed horsepower

Duke originally requested in their application that corrections be made to 13 emergency generators on campus. The changes have been requested following a recent facility review of these generators, during which discrepancies between the actual horsepower ratings and the ratings listed in the permit were observed. Duke subsequently revised the list of 13 generators to nine.

These generators are listed in the following table, with name changes (if requested), the horsepower (HP) ratings listed in the permit, and the corrected HP ratings.

Source ID No.	Name in current permit	New name (if changed)	HP, current permit	HP, corrected
I-7776-01	Duke Hospital LSRC II	---	430	465
I-7552-01	DUMC, BMT Dialysis	---	65	50
I-7739-01	Sanford Addition	Rubenstein Hall	90	122
I-7198-01	Nasher Art Museum	---	155	176
I-7733-01	Center for Athletic Excellence	---	67	130
I-7760-02	Fuqua Business School 2	Fuqua School of Business 2	671	779
ES-7764-01	Primate Center	---	764	772
ES-7735-01	CIEMAS	---	1200	1085
ES-7559-01	Cancer Center	---	2682	2937

The first six generators in the preceding table were classified as insignificant activities because of size or production rate under 15A NCAC 02Q .0503(8). For some, the corrected HP rating was lower than the original HP rating; these would clearly remain insignificant sources. To see if those generators which increased in size would remain insignificant sources, emissions from the generator with the largest corrected HP rating (diesel fuel-fired emergency generator (779 HP) ID No. I-7760-02, Fuqua School of Business 2) were estimated using the DAQ emissions estimation spreadsheet for large internal combustion engines (Rev J, 06/22/15).

Assuming the maximum annual limits of operation for an emergency generator (500 hours), and a diesel fuel sulfur content of 0.5 percent, the largest estimated amount of any single criteria pollutant emitted from generator No. I-7760-02 is 4.67 tons per year of nitrogen oxide, which is less than the five tons per year limit in 02Q .0503(8). The largest estimated amount of any single hazardous air pollutant emitted from the generator is 2.12 pounds per year of benzene, which is much less than the 1000 pounds per year limit in 02Q .0503(8). Since none of the six generators classified as insignificant activities will have emissions exceeding those of generator No. I-7760-02, they will remain classified as insignificant activities.

Two of the last three emergency generators listed in the previous table remain subject to emission limits imposed by current state regulations for sulfur dioxide, or SO_2 (2.3 pounds per million Btu heat input) and visible emissions (20 percent opacity). These are: Primate Center (ID No. ES-7764-01) and CIEMAS (ID No. ES-7735-01). The third emergency generator, ID No. ES-7559-01, Cancer Center, remains subject to 40 CFR 60 Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. It is limited to using diesel fuel with a maximum sulfur content of 15 parts per million. The impact of the HP rating correction for these three emergency generators are shown below, using the DAQ emission estimation spreadsheet described above (Rev J, 06/22/15).

ID No.	Source Name	HP in Current Permit	SO_X Emission estimate with current HP, lb/yr	Corrected HP	SO_X Emission estimate w/ corrected HP, lb/yr	Increase in emissions, lb/yr	Percent increase in emissions
ES-7764-01	Primate Center	764	1,545.19	772	1,561.37	16.18	1.0
ES-7735-01	CIEMAS	1200	2,427.00	1085	2,194.41	-232.59	-9.6
ES-7559-01	Cancer Center	2682	5,424.35	2937	5,940.08	515.73	9.5

As shown, the HP rating correction results in minimal increases in SO_2 emissions – and in the case of the generator at CIEMAS, a decrease in SO_2 emissions. In addition, for the generator at the Cancer Center (ES-7559-01) which is subject to 40 CFR 60 Subpart IIII, total HAP emissions would increase from to 16.46 lb/yr to 18.02 lb/yr, with the largest quantity of HAP being benzene (increasing from 7.28 lb/yr to 7.98 lb/yr).

In summary, these changes do not affect the regulatory requirements for these generators, and should have little impact on overall facility emissions. Continued compliance is expected.

B. *Removal of permit condition 2.2.B.1 (annual reporting requirement related to the 2011 Coal Boilers Removal Project) from the permit.*

In 2011, Duke University submitted permit application No. 3200144.11B, requesting the significant modification (processed in accordance with 15A NCAC 02Q .0501(c)(2) – 2 step), otherwise known as the 2011 Coal Boilers Removal Project. The project/modification included the following steps:

- install one 99 million British thermal unit per hour (mmBtu/hr) heat input temporary boiler and one 96.5 mmBTU/hr permanent boiler (ID Nos. ES-7754-01T and ES-7754-03b), both capable of combusting natural gas and No. 2 fuel oil
- replace one (1) existing insignificant paint spray booth (ID No. I-030).
- remove existing 96.1 mmBtu/hr coal/natural gas-fired boilers #1 and #2 and existing 99.99 Btu/hr coal/fuel oil-fired boiler #3 (ID Nos. ES-7754-01, ES-7754-02 and ES-7754-03, respectively)

This modification was anticipated to result in a net decrease in potential emissions of prevention of significant deterioration (PSD) pollutants, rather than a significant emissions increase. To determine baseline emissions, Duke reviewed the five years of throughput data prior to 2011 and selected the relevant two-year period from 2006-2007.[1] The evaluation Duke provided included emissions that were listed as excludable under the capable of accommodating classification[2]. The full analysis indicated significant overall decreases in all PSD pollutants. DAQ did not formally review the basis of the "excludable

[1] For an existing emissions unit, *baseline actual emissions* means the average rate, in tons per year, at which the emissions unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the 5-year period immediately preceding the date that a complete permit application is received by the Division for a permit required under this Rule.

[2]Projected emission increases can be excluded if (a) a unit could have accommodated the emissions during the baseline 24-month period, (b) the increases do not result from the particular project, and (c) the increases are related to increased product demand.

emissions" because the projected actual emissions[3] alone when compared to the baseline emissions also projected an overall decrease in PSD pollutants.

Pursuant to 15A NCAC 02D .0530(u), because Duke used projected actual emissions in demonstrating the modification would not result in a significant emissions increase, permit condition 2.2.B.1 was included in the 2011 permit modification, requiring Duke to submit annual reports for five years containing the items listed in 40 CFR 51.166(r)(6)(v)(a) through (c) for five years. In addition, the permit condition required reporting of natural gas usage for boiler 3b (ID No. ES-7754-03b), and an explanation of any case in which the actual gas usage exceeded the projected usage of 625.9 million cubic feet per year.

Because Duke has demonstrated the modification did not result in a significant emissions increase, the annual reporting requirement related to the 2011 Coal Boilers Removal Project has been removed from the permit. Continued compliance is expected.

6. Regulatory Review

The Duke facility remains subject to the following state regulations:

- 15A NCAC 02D .0503: Particulates from Fuel Burning Indirect Heat Exchangers
- 15A NCAC 02D .0516: Sulfur Dioxide Emissions from Combustion Sources
- 15A NCAC 02D .0521: Control of Visible Emissions
- 15A NCAC 02Q .0317: Avoidance Conditions for:
    - 15A NCAC 02D .0530: Prevention of Significant Deterioration
    - Area Sources Subject to MACT Subpart JJJJJJ (Industrial, Commercial, and Institutional Boilers Area Sources)
    - 15A NCAC 02D .0531: Sources in Non-Attainment Areas
    - Recycled Fuel Oil (No. 2 Equivalent) Requirements to Avoid Toxic Air Pollutant Control Rules [Avoidance of 15A NCAC 02D .1100]
- 15A NCAC 02D .1100, Toxic Air Pollutant Emissions Limitation and Reporting Requirements (State-enforceable only)
- 15A NCAC 02D .1806, Control and Prohibition of Odorous Emissions (State-enforceable only)
- 15A NCAC 02D .0530(u): Use of Projected Actual Emissions

A regulatory review for the all existing sources will not be included in this document except for the removal of the .0530(u) condition as noted in Section 5B above. No changes have been made to equipment or processes at the facility that have necessitated the addition, removal, or change of state regulations in the permit. The permit has been updated to reflect the most current stipulations for all applicable regulations. Continued compliance is expected.

7. National Emission Standards for Hazardous Air Pollutants (NESHAP)/Maximum Achievable Control Technology (MACT)/Generally Available Control Technology (GACT)

The Duke facility is subject to the following NESHAP, in accordance with 15A NCAC 02D .1111:

- 40 CFR 63 Subpart ZZZZ, NESHAP for Stationary Reciprocating Internal Combustion Engines
- 40 CFR 63 Subpart WWWWW, NESHAP for Hospital Ethylene Oxide Sterilizers

[3] *Projected actual emissions* means the maximum annual rate, in tons per year, at which an new or existing emissions unit is projected to emit a regulated NSR pollutant in any one of the 5 years (12-month period) following the date the unit resumes regular operation after the project, or in any one the 10 years following that date, if the project involves increasing the emissions unit's design capacity or its potential to emit a regulated NSR pollutant and full utilization of the unit would result in a significant emissions increase or a significant net emissions increase.

- 40 CFR Part 63 Subpart JJJJJJ: National Emissions Standard for Hazardous Air Pollutants for Area Sources: Industrial, Commercial, and Institutional Boilers

This permit renewal does not affect this status. No changes have been made to equipment or processes at the facility that have necessitated the addition, removal, or change of NESHAP in the permit. The permit has been updated to reflect the most current stipulations for all applicable regulations.

Duke has satisfied the requirement in Section 2.2 E.1.e of the permit to submit a Notification of Compliance Status (NOCS) no later than July 19, 2014 for natural gas/No. 2/Low sulfur No. 4/recycled No. 2/recycled low sulfur No. 4 fuel oil-fired Boilers Nos. 4, 5, and 6 (**ID Nos. ES-7754-04, ES-7754-05, and ES-7754-06**). The permit has been revised to reflect that Duke submitted the NOCS on July 11, 2014.

Continued compliance is expected.

8. New Source Performance Standards (NSPS)

The Duke facility is subject to the following NSPS, in accordance with 15A NCAC 02D .0524:

- 40 CFR 60 Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units
- 40 CFR 60 Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

For Subpart Dc, Duke satisfied the permit requirement in 2.1 F.4.c to provide notification of initial startup of boilers **ID Nos. ES-7254-EC1 to ES-7254-EC15**. DAQ received notification on December 11, 2009 that the initial startup of these boilers occurred on December 4, 2009. The notification requirement has been removed in this permit renewal.

9. New Source Review (NSR)/Prevention of Significant Deterioration (PSD)

To avoid applicability of 15A NCAC 02D .0530, Prevention of Significant Deterioration, the Duke facility has accepted the following avoidance conditions in their permit for Boiler Nos. 4, 5, and 6 (ID Nos. ES-7754-04 through -06):

- the increased PM_{10} emissions from the combustion of low sulfur No. 4 fuel oil and recycled low sulfur No. 4 in these boilers shall not exceed 15 tons during any consecutive 12-month period,
- the maximum sulfur content of any No. 4 and recycled No. 4 fuel oil received and burned in these boilers shall not exceed 0.5 percent by weight, and
- the total No. 4 and recycled No. 4 fuel usage in these boilers shall not exceed 8,400,000 gallons per consecutive 12 months.

This permit renewal does not affect this status. Continued compliance is expected.

10. Risk Management Program (Clean Air Act, Section 112(r))

40 CFR Part 68 establishes requirements for stationary sources that hold more than threshold quantities of regulated substances to develop a risk management plan (RMP), in accordance with Section 112(r) of the Clean Air Act. The RMP identifies the potential effects of a chemical accident, steps the facility is taking to prevent an accident, and emergency response procedures if an accident occurs.

The Duke facility does not appear to store regulated substances in sufficient quantities to be subject to the Risk Management Program requirements. This permit renewal does not affect this status.

10. Compliance Assured Monitoring (CAM)

40 CFR Part 64 establishes requirements for compliance assurance monitoring (CAM). This rule applies to any pollutant specific unit that meets the following three conditions:

- the unit is subject to any non-exempt emission limitation or standard for the applicable regulated pollutant.
- the unit uses any control device to achieve compliance with any such emission limitation or standard.
- the precontrol potential emission rate for the unit exceeds either 100 tons per year for criteria pollutants, 10 tons per year of a single HAP, or 25 tons per year of multiple HAPs.

CAM was determined in a preceding permit review (January 13, 2015) to be not applicable to any of the sources at the Duke facility. This permit renewal does not affect the facility's status with respect to CAM.

11. Facility-wide Toxics Review

Duke submitted modeling analyses on December 23, 2008, and February 3, 2010, which were both reviewed by DAQ (see 1/14/09 Dispersion Modeling Analysis memo from Tom Anderson, and 2/09/10 Dispersion Modeling Review memo from Jerry Freeman). Both analyses successfully demonstrated compliance, on a source-by-source basis, with the NC Acceptable Ambient Levels.

The Duke permit was amended by administrative amendment (application no. 3200144.09F, permit no. 03254/T32, September 15, 2009) to add a State-Only Requirement for air toxics emitted from the ethylene oxide sterilizers **(ID Nos. ES-7531-01 through ES-7531-03, and ES-7547-06 through ES-7547-09)**. The sterilizers are subject to an ethylene oxide emission limit of 18.02 pounds per year.

The Duke permit was modified (application no. 3200144.08C, permit no. 03254/T28, January 16, 2009 to allow the burning of recycled No. 2 and low sulfur No. 4 fuel oil in boilers 4, 5, and 6 (**ID Nos. ES-7754-04 through 06)** under the existing NC Toxics avoidance condition.

Based on the most recent inspection, Duke has been in compliance with air toxic regulations. Continued compliance is expected.

12. Facility Emissions Review

The table on the header page of this review summarizes emissions for Duke after application of required emission controls for the years 2013 through 2017.

From the 2018 emissions inventory, actual emissions emitted at the Duke facility are as follows:

Pollutant	SO2	NOX	VOC	CO	PM_{10}	$PM_{2.5}$	Total HAP	Largest HAP
2018 Emissions, tons/year	0.5	80.623	5.68	77.706	1.55	1.48	1.56	1.48 [Hexane, n-]

As discussed above in Section 5A of this review, the corrections to the emergency generator ratings at the Duke facility suggest only a minimal increase in the estimated overall facility-wide emissions. These corrections do not reflect a modification at the facility or change in facility operations, but rather a more accurate understanding of existing facility sources.

13. Compliance Status

The facility was last inspected on August 17, 2018 by Stanley Williams of the Raleigh Regional Office. The company appeared to be in compliance with all applicable requirements at that time.

A Notice of Violation was issued to Duke on March 9, 2016 for failure to submit a 2015 annual compliance certification by its due date. A Notice of Deficiency was issued to Duke on October 3, 2019 for failure to report Coal Boiler Removal Project data as required by the permit. Duke subsequently submitted the required data on October 21, 2019. No other violations have been issued since the previous permit renewal.

14. Public Notice/EPA and Affected State(s) Review

A notice of the DRAFT Title V Permit shall be made pursuant to 15A NCAC 02Q .0521. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Consistent with 15A NCAC 02Q .0525, the EPA will have a concurrent 45-day review period. Copies of the public notice shall be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 02Q .0522, a copy of each permit application, each proposed permit and each final permit shall be provided to EPA. Also, pursuant to 02Q .0522, a notice of the DRAFT Title V Permit shall be provided to each affected State at or before the time notice is provided to the public under 02Q .0521 above. There are no affected states or local programs within 50 miles of the facility.

15. Other Regulatory Considerations

A P.E. seal was not required for Permit Application No. 3200144.19A.

A zoning consistency determination was not required for Permit Application No. 3200144.19A.

No permit fee was required for Permit Application No. 3200144.19A.

16. Recommendations

DAQ has reviewed the permit application for Duke University located in Durham, Durham County, North Carolina to determine compliance with all procedures and requirements. DAQ has determined that this facility is complying or will achieve compliance, as specified in the permit, with all requirements that are applicable to the affected sources. DAQ recommends the issuance of Air Permit No. 03254T43.